

WHAT IS CLAIMED IS:

1. An inkjet pen having a pen body and an associated reservoir of ink, the pen comprising:

a multilayered substrate having an inlet opening in a first layer of the multilayered substrate, a plurality of ink feed slots in a second layer of the multilayered substrate, and an ink manifold disposed in at least a third layer of the multilayered substrate, the ink manifold fluidically coupling the inlet opening to the plurality of ink feed slots;

a plurality of printhead dies mounted to a first side of the substrate, each printhead die comprising an array of printing elements and an ink refill slot, each of the plurality of printhead dies coupled to an associated one ink feed slot such that ink is delivered to the ink refill slot of each printhead die; and

wherein each printing element of the array of printing elements comprises a firing chamber coupled to a feed channel that is coupled to the ink refill slot whereby ink is delivered to each firing chamber.

2. An inkjet pen in accordance with claim 1 further comprising an interconnecting pattern of wiring lines disposed on at least one layer of the multilayered substrate and electrically coupled to the plurality of printhead dies.

3. An inkjet pen in accordance with claim 2 further comprising an electrical integrated circuit disposed on the first layer of the multilayered substrate and electrically coupled to the interconnecting pattern of wiring lines.

4. An inkjet pen in accordance with claim 1 wherein the pen body further comprises the associated reservoir of ink.

5. A printhead for an inkjet pen comprising:

a multilayered substrate having first and second outer layers and at least first and second inner layers and having an inlet opening, a plurality of ink feed slots, and an ink manifold fluidically coupling the inlet opening to the plurality of ink feed slots, the ink manifold formed from overlapping channel slots disposed in the at least first and second inner

layers of the multilayered substrate, the ink opening formed in the first outer layer and the ink feed slots formed in the second outer layer; and

a plurality of printhead dies mounted to the second outer layer of the multilayered substrate and disposed in association with the ink feed slots to couple ink to each of the plurality of printheads.

6. A printhead in accordance with claim 5 wherein the multilayered substrate further comprises an interconnecting pattern of wiring lines disposed on at least one layer of the multilayered substrate and electrically coupled to the plurality of printhead dies.

7. A printhead in accordance with claim 6 further comprising an electrical integrated circuit disposed on the first outer layer of the multilayered substrate and electrically coupled to the interconnecting pattern of wiring lines.

8. A method of manufacturing a printhead for an inkjet pen comprising the steps of:
creating first and second outer layers and at least first and second inner layers in a multilayered substrate;

creating an inlet opening in the first outer layer of the multilayered substrate;

creating a plurality of ink feed slots in the second outer layer of the multilayered substrate;

fluidically coupling the inlet opening to the plurality of ink feed slots by way of an ink manifold formed from overlapping channel slots disposed in the at least first and second inner layers of the multilayered substrate; and

mounting a plurality of printhead dies to the second outer layer of the multilayered substrate in association with the ink feed slots to couple ink to each of the plurality of printheads.

9. A method in accordance with the method of claim 8 further comprising the step of affixing the printhead to the inkjet pen.

10. A method in accordance with the method of claim 8 further comprising the step

of coupling a supply of ink to the printhead.

11. A method in accordance with the method of claim 8 further comprising the steps of disposing an interconnecting pattern of wiring lines on at least one layer of the multilayered substrate and electrically coupling the interconnecting pattern of wiring lines to the plurality of printhead dies.

12. A method in accordance with the method of claim 11 further comprising the steps of disposing an electrical integrated circuit on the first outer layer of the multilayered substrate and electrically coupling the electrical integrated circuit to the interconnecting pattern of wiring lines.

13. An inkjet pen, comprising:

a pen body;

a reservoir of ink within the pen body;

a multilayered ceramic carrier substrate having an electrical interconnection pattern of wiring lines, an inlet opening, a plurality of ink feed slots and an ink manifold fluidically connecting the inlet opening to the plurality of ink feed slots, the carrier substrate being mounted to the pen body, the carrier substrate receiving ink from the reservoir at the inlet opening;

a plurality of printhead dies mounted to a first side of the carrier substrate, each printhead die electrically coupled to the interconnection pattern of wiring lines and comprising an array of printing elements and an ink refill slot, each one of the plurality of printhead dies receiving ink at the ink refill slot from the reservoir by way of the ink manifold, the ink refill slot coupled to the manifold at a corresponding one of the ink feed slots; and

wherein each one printing element of the array of printing elements comprises a nozzle chamber, a firing resistor, a feed channel, and a nozzle opening, the feed channel being coupled to the ink refill slot of the printhead die which includes said feed channel and ink refill slot.

14. The inkjet pen of claim 13, in which the inkjet manifold includes a manifold channel formed by overlapping channel slots in multiple layers of the carrier substrate, the manifold channel connecting the ink inlet opening to the plurality of ink feed slots, and wherein the ink inlet opening is formed in one layer of the substrate, the ink feed slots are formed in another layer of the substrate and the overlapping channel slots are formed in a plurality of other layers of the substrate.

15. The inkjet pen of claim 13, wherein the reservoir is a first reservoir and further comprising a second reservoir for storing ink,

wherein the inlet opening is a first inlet opening and the carrier substrate having a second inlet opening for receiving ink from the second reservoir,

wherein the manifold forms separate fluid paths for ink from the first reservoir and ink from the second reservoir, a first fluid path occurring from the first inlet opening to a first set of the ink feed slots and a second fluid path occurring from the second inlet opening to a second set of the ink feed slots, the first set and second set being mutually exclusive, and

wherein the ink refill slot from any given printhead die is coupled to an ink feed slot which is among one of either the first set or second set of ink feed slots.

16. An inkjet printing system, comprising:

a housing;

a mounting assembly;

a media transport assembly;

a controller; and

an inkjet pen;

wherein the inkjet pen is positioned at the mounting assembly and includes a plurality of printing elements; a print zone occurring adjacent to the plurality of printing elements along a media path; the media transport assembly moving a media sheet along the media path into the print zone; the controller determining a timing pattern for ejecting ink from the plurality of printing elements onto the media sheet; the mounting assembly, media transport assembly, and controller located within the housing;

wherein the inkjet pen comprises:

a pen body;

a reservoir of ink within the pen body;

a multilayered ceramic carrier substrate having an electrical interconnection pattern of wiring lines, an inlet opening, a plurality of ink feed slots and an ink manifold fluidically connecting the inlet opening to the plurality of ink feed slots, the carrier substrate being mounted to the pen body, the carrier substrate receiving ink from the reservoir at the inlet opening;

a plurality of printhead dies mounted to a first side of the carrier substrate, each printhead die electrically coupled to the interconnection pattern of wiring lines and comprising an array of printing elements and an ink refill slot, each one of the plurality of printhead dies receiving ink at the ink refill slot from the reservoir by way of the ink manifold, the ink refill slot coupled to the manifold at a corresponding one of the ink feed slots; and

wherein each one printing element of the array of printing elements comprises a nozzle chamber, a firing resistor, a feed channel, and a nozzle opening, the feed channel being coupled to the ink refill slot of the printhead die which includes said feed channel and ink refill slot.

17. The inkjet printing system of claim 16, in which the inkjet manifold includes a manifold channel formed by overlapping channel slots in multiple layers of the carrier substrate, the manifold channel connecting the ink inlet opening to the plurality of ink feed slots, and wherein the ink inlet opening is formed in one layer of the substrate, the ink feed slots are formed in another layer of the substrate and the overlapping channel slots are formed in a plurality of other layers of the substrate.

18. The inkjet printing system of claim 16, wherein the reservoir is a first reservoir and further comprising a second reservoir for storing ink,

wherein the inlet opening is a first inlet opening and the carrier substrate having a second inlet opening for receiving ink from the second reservoir,

wherein the manifold forms separate fluid paths for ink from the first reservoir and ink from the second reservoir, a first fluid path occurring from the first inlet opening to a first set

of the ink feed slots and a second fluid path occurring from the second inlet opening to a second set of the ink feed slots, the first set and second set being mutually exclusive, and wherein the ink refill slot from any given printhead die is coupled to an ink feed slot which is among one of either the first set or second set of ink feed slots.

19. A method for loading a plurality of inkjet nozzle chambers of an inkjet pen having an internal reservoir, a multilayered ceramic substrate and a plurality of printhead dies, the method comprising the steps of:

replacing the internal reservoir;

flowing ink from the internal reservoir into an ink manifold of the carrier substrate, the carrier substrate having an inlet opening coupled to the internal reservoir, a plurality of ink feed slots and the ink manifold, the ink manifold fluidly connecting the inlet opening to the plurality of ink feed slots;

flowing ink from the manifold out the plurality of ink feed slots at the carrier substrate into respective ink refill slots of a plurality of printhead dies mounted to the carrier substrate, each printhead die comprising an array of printing elements and an ink refill slot, each one of the plurality of printhead dies receiving ink at the ink refill slot from the internal reservoir by way of the ink manifold;

flowing ink from each respective ink refill slot into a plurality of nozzle chambers coupled to said respective ink refill slot.